REMARKS

Entry of the foregoing amendments and reconsideration of the subject application is respectfully requested. Claims 1-19 are pending, however, claims 5-19 have been withdrawn, claims 1-4 are under examination, and claims 1-2 have been amended.

Claim 2 stands rejected under 35 U.S.C. §112, second paragraph as being indefinite; claim 1 stands rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,462,779 to Misiano et al.; claim 2 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Misiano et al.; and claims 3 and 4 stand rejected under 35 U.S.C. §102(b) as anticipated by or, in the alternative under 35 U.S.C. §103(a), as obvious over Misiano et al.

Applicants respectfully traverse the pending rejections for the following reasons.

Claim Amendments

Applicants have amended claims 1 and 2 in order to further clarify their invention. In claim 1, a recitation of the method of forming the inorganic oxide layer has been added, and the film thickness ratio has been further clarified that it applies in both a transverse and a longitudinal direction. Claim 2 has also been amended to clarify that the wt% difference applies in both a longitudinal and a transverse direction as well. Support for these amendments may be found in the now withdrawn but pending claims 5-19 and on page 8 of the originally filed application.

As to the apparent confusion regarding the recitation in claim 2, Applicants believe that the language is clear. Claim 2 claims that the difference between a maximum wt% and a minimum wt% of a component of the inorganic oxide layer, which is a composite and has at least two components, is within 20 wt%. Therefore, the wt% uniformity of at least one component of the inorganic oxide layer is within 20 wt%.

In view of the claim amendments, Applicants respectfully request withdrawal of the pending 35 U.S.C. §112, second paragraph rejection.

The Present Invention

The present invention provides a functional roll film with an inorganic oxide layer that not only has flexibility and good gas barrier properties, but also good transparency. These properties are achieved by forming the inorganic oxide layer through a controlled evaporation, while continuously monitoring the inorganic oxide layer's thickness and having the inorganic oxide layer's thickness ratio be 1.5 or less. If the maximum film thickness of

the inorganic oxide layer exceeds 1.5 times the minimum value thereof, the flexibility of a thick portion of the inorganic oxide layer decreases as compared with that of a thin portion. This can lead to cracking in the thick portion and degradation of the gas barrier properties of the film.

The present invention avoids this problem through the claimed method of forming the inorganic oxide layer and by limiting the film thickness uniformity in the transverse and longitudinal directions.

U.S. Patent No. 5,462,779, to Misiano et al. Does Not Anticipate or Render the Pending Claims Obvious

Claims 1-4 stand rejected under 35 U.S.C. §102(b) or §103(a) over Misiano et al. Misiano et al. is cited as disclosing a functional roll film with an inorganic oxide layer and a "ratio of the maximum thickness to the minimum thickness of the inorganic oxide layer . . . *inherently* 1.5 or less" (emphasis added). See page 3 of the Office Action mailed September 11, 2002.

Applicants respectfully disagree. Misiano et al. does not disclose or suggest to one of ordinary skill in the art the thickness ratio as claimed. Nor does Misiano et al. disclose or suggest the claimed way in which the inorganic oxide layer is formed and its resulting characteristics.

Misiano et al. appears to disclose a thin film multilayer structure as a permeation barrier on a plastic film and in Fig. 2, there appears to be shown an Al_2O_3/SiO_2 mixed layer formed on a roll of PET film by vapor deposition. In Misiano et al., however, there is neither disclosure or a suggestion of the need to control the thickness variation of the Al_2O_3/SiO_2 mixed layer in either the transverse or longitudinal directions. Nor is there recognition that the inorganic oxide layer should have good flexibility and gas barrier properties and that the layer can be stably secured to the plastic film when a thickness variation width is controlled to less than a prescribed value. Applicants submit that the objective of Misiano et al., is not to attain a homogenous mixed layer of Al_2O_3/SiO_2, but to form a mixed layer with a composition graded in a film thickness direction, which is altogether different from the present invention, which forms a homogenous mixed layer of Al_2O_3/SiO_2. Therefore, Applicants submit that a film formed using the method of Misiano et al. would not have excellent gas barrier properties, nor be resistant to cracking, as is the present invention.

In addition, while it might be possible to restrict the thickness variation of an

Al_2O_3/SiO_2 mixed layer along both transverse and longitudinal directions to less than a prescribed value in a narrowly limited area, it would be extremely difficult to achieve a continuous thickness variation of less than a prescribed value along the entire transverse and longitudinal directions on a long roll film. See the method disclosed in Fig. 5 of Misiano et al. That is to say, since Al_2O_3 and SiO_2 in a crucible are gradually consumed as evaporation advances, and the degree of vacuum in the chamber and the ambient temperature alter with time, evaporation velocities of Al_2O_3 or SiO_2 constantly change, thereby limiting the realization of a thickness uniformity in a film formed on a surface.

In addition, in Misiano et al., there is no recognition or measures taken in order to assure film thickness uniformity in a transverse film direction. Therefore, non-uniformity of a film thickness in a transverse film direction cannot be avoided since variations arise in the thickness of a film formed based on the distance from the crucible, which is the evaporation source. That is, while a thicker film is formed in the central portion in a transverse film direction, which is the shortest in distance from the crucible, if the crucible is located under the center of the transverse film direction, a thinner film would form toward the edge portion in a transverse film direction because of an increase in distance from the crucible.

Finally, Misiano et al. does not disclose a concrete method to assure uniform film thickness and there are no control mechanisms, as in the present invention, to reduce variation in film thickness. Therefore, even though Misiano et al. appears to disclose a "coating rate . . . sufficient in all cases to apply a completely uniform coating to a constant thickness," Applicants submit that in reality, the films are considerably inhomogeneous with a large film thickness variation.

Therefore, the present invention as claimed patentably distinguishes over Misiano et al. and independent claim 1 and dependent claims 2-4 are allowable.

CONCLUSION

It is respectfully submitted that the present application is in condition for allowance, which action is earnestly solicited. Upon consideration of this response, the Examiner is kindly invited to contact the undersigned to discuss any matter that would expedite allowance of the subject application.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

1. [Twice Amended] A functional roll film comprising:

a transparent plastic film having gas barrier properties, and having an inorganic oxide layer on at least one surface, wherein the plastic film is formed into a roll[;], and further wherein said inorganic oxide layer is formed by controlling an evaporation amount related to an evaporation condition, while continuously monitoring the film thickness of said inorganic oxide layer; and

wherein the ratio of the maximum film thickness to the minimum film thickness of said inorganic oxide layer formed on said plastic film along both a transverse direction and a longitudinal direction is 1.5 or less.

2. [Twice Amended] A functional roll film according to claim 1, wherein said inorganic oxide layer comprises a composite oxide having at least two components, wherein the difference between a maximum wt% [of] and minimum wt% of one component of the composite oxide in both a longitudinal direction and a transverse direction is within 20 wt%.